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AMSAT NEWS SERVICE
ANS-276

The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on http://www.amsat.org publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to: ans-editor [at] amsat.org

You can sign up for free e-mail delivery of the AMSAT News Service Bulletins via the ANS List; to join this list see: https://mailman.amsat.org/postorius/lists/ans.amsat.org/

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ANS-276 AMSAT News Service Weekly Bulletins

To: All RADIO AMATEURS
From: Radio Amateur Satellite Corporation
712 H Street NE, Suite 1653
Washington, DC 20002

DATE 2021 Oct 3

Past AMSAT President and Director, and Amateur Satellite Pioneer Tom Clark, K3IO, SK

AMSAT-NA Past President and ham radio satellite and digital pioneer Tom Clark, K3IO (ex-W3IWI), of Columbia, Maryland, died on September 28 after a short illness and hospital stay. An ARRL Life Member, he was 82. Clark’s accomplishments are legendary, and he left a lasting footprint in the worlds of amateur radio satellites and digital techniques.

“His long-time technical achievements, mentoring to others, and technical leadership will be missed by his many peers and friends the world over,” said Bob McGwier, N4HY.

To honor Clark, AMSAT has rebranded its upcoming annual gathering as the 2021 AMSAT Dr. Tom Clark, K3IO, Memorial Space Symposium and Annual General Meeting. It will take place on October 30 via Zoom. (AMSAT members may register to attend via AMSAT's Membership and Event portal.) The event will be livestreamed on AMSAT's YouTube channel.

A founding member of Tucson Amateur Packet Radio (TAPR), Clark was a co-founder of the TAPR/AMSAT DSP Project, which led to software-defined radio (SDR). He was a leader in the development of the AX.25 packet radio protocol. Clark served as AMSAT's second President, from 1980 until 1987. He also served on the AMSAT and TAPR Boards.

In concert with McGwier, Clark developed the first amateur Digital Signal Processing (DSP) hardware, including a number of modems. He developed the uplink receivers and the spacecraft LAN (local area network) architecture used on all the Microsats (AMSAT-OSCAR 16, Dove-OSCAR 17, WEBERSAT-OSCAR 18, LUSAT-OSCAR 19, Italy-OSCAR 26, AMRAD-OSCAR 27, and TMSAT-OSCAR 31). McGwier said it was Clark who convinced him in 1985 that the future lay in DSP.

"We started the TAPR/AMSAT DSP [digital signal processing] project, and it was announced in 1987," McGwier recounted. "We showed in our efforts that small stations with small antennas could bounce signals off the moon, and, using the power of DSP, we could see the signals in our computer displays." This led to the software-defined transponder (SDX) for satellite work, including ARISSat and AMSAT's Phase 3E.

Clark received a doctorate in astrogeophysics from the University of Colorado. He went on to serve as Chief of the Astronomy Branch at NASA Marshall Space Flight Center and was a Senior Scientist at NASA Goddard Space Flight Center, where he was principal investigator for the Space Very Long Baseline Interferometry (VLBI) activity there.

In 2005, Clark became the first non-Russian to be awarded a Gold Medal of the Russian Academy of Sciences for his contributions to the international VLBI network. He is a member of the 2001 class of CQ magazine's Amateur Radio Hall of Fame.

In 2016, ARRL awarded Clark with its President's Award, to recognize his 60 years of advancing amateur radio technology. On that occasion, McGwier said, "There would be no AMSAT to inspire all of this work without Tom Clark. Tom…saved the organization and inspired all of us to look to the future and aim for the stars."

Clark was a Fellow of the American Geophysical Union and the International Association of Geodesy.

[ANS thanks the ARRL for the above information]

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on September 28th. He was 82.

The 2021 AMSAT Dr. Tom Clark, K3IO, Memorial Space Symposium and Annual General Meeting will be held virtually on Zoom on October 30th. AMSAT members may register to attend via AMSAT's Member Portal, https://launch.amsat.org.

The 2021 AMSAT Dr. Tom Clark, K3IO, Memorial Space Symposium will also be available to the general public as a livestream event on AMSAT's YouTube channel, https://youtu.be/RTvcceM7Tz0.

Please join us to celebrate the many contributions of Dr. Tom Clark, K3IO, and the exciting opportunities of Amateur Radio in space.

[ANS thanks Robert Bankston, KE4AL, AMSAT President, for the above information]

VUCC Awards-Endorsements for October 1,2021

Here are the endorsements and new VUCC Satellite Awards issued by the ARRL for the period September 1, 2021 through October 1, 2021. Congratulations to all those who made the list this month!

Congratulations to Douglas Tabor N6UA on achieving the AMSAT GridMaster

CALL	Sept.	October	
K8DP	1262	1275	ex-KD8CAO
N8RO	1105	1111	
N0JE	675	681	
ND0C	531	555	
KF6JOQ	503	553	
N4DCW	476	525	
VE1VOX	507	510	
WA4HFN	454	505	
K5TA	479	500	
W8LR	479	500	
KX9X	302	420	
DF2ET	300	400	
VE4MM	361	376	
EA2AA	346	375	
KX9X (EN50)	250	363	
KQ4DO	306	353	
KA9P	259	301	
AD5JK	102	263	
KD0ZW	New	216	
XE2YWH	187	205	
VE3KY	182	201	
XE1MYO	100	200	
N8MR	154	175	
DG7RO	New	172	
KN4ZUJ	100	170	
KC1MEB	102	168	
N8URE (EL95)	134	163	
N0RC	104	151	
N1DM	New	151	
WD9EWK (DM25)	New	120	
XE2YWH (DL82)	New	110	
OE7BJT	New	107	
XE2YWH (DL82)	New	105	
9M2CQC	New	104	
JH0BBE	New	100	

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W3VHF   New     100
XE2HWB  New     100
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If you find errors or omissions. please contact me off-list at <mycall>@<mycall>.com and I'll revise the announcement.This list was developed by comparing the ARRL .pdf listings for the two months. It's a visual comparison so omissions are possible. Apologies if your call was not mentioned. Thanks to all those who are roving to grids that are rarely on the birds. They are doing a lot of the work!

[ANS thanks Ron Parsons, W5RKN, for the above information]

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Z-Sat
Freq: 145.875MHz CW
https://twitter.com/KOMAKI_AMSATCOM/status/1443125922010308608

Komaki Amateur SATCOM Club has an amateur radio station in Komaki City, Japan.

The 50 kg class infrared observation microsatellite "Z-Sat" developed by Mitsubishi Heavy Industries will be launched by the Epsilon rocket on October 1st.

After satellite separation, Z-Sat will start transmitting CW beacon of VHF band. The beacon signal is in Morse code and contains information such as satellite battery voltage. This information is very important as survival information immediately after the satellite is put into orbit.

Therefore, if you can receive the beacon signal from the satellite immediately after the satellite launch, we would appreciate it if you could report it.

Komaki Amateur SATCOM Club's twitter is open at the following address.

Information on Z-Sat transmission frequency, data format, orbit TLE, etc. will be released in the future.

https://twitter.com/KOMAKI_AMSATCOM

KOSEN-1
Freq: 435.525MHz CW
http://space.kochi-ct.jp/kosen-1

NanoDragon
Freq: 437.365MHz 1.2k BPSK
https://vnsc.org.vn/en/news-events/nanodragon-public-announcement/

[ANS thanks Akira Kaneko, JA1OGZ, and Yasutaka Narusawa, JR2XEA, for the above information]

Apogee View - From the July/August 2021 AMSAT Journal

A Sustained FM Presence in LEO

While our volunteer engineers focus their efforts on GOLF, developing the systems and technologies necessary for our path upward to HEO, we must not forget our responsibility to promote amateur radio satellites and encourage the next generation of operators and builders.

Advancing the art and science is not enough. We also need to provide an easy entry point to amateur radio satellite communications to support of our space education and outreach activities.

The Importance of EasySats

AMSAT’s Echo (AO-51) and Fox-1 (AO-85, AO-91, and AO-92) satellites, as well as SaudiSat-1C (SO-50) have been the most widely used amateur satellites. What makes them so popular is their ability to provide basic radio communications, with very simple ground station equipment, and their

ease of use. An FM repeater, even in a low Earth orbit (LEO), allows amateur radio operators to communicate over substantial distances using just a handheld transceiver (an HT) and a small handheld directional antenna. Cross-continental and, if you are lucky enough to live near the coast, transcontinental communications are possible.

These so called “EasySats” have provided countless hours of enjoyment to thousands and thousands of amateur radio satellite operators around the world, making QSOs, chasing grids, and even just a chance to send out a casual hello to an old friend. More importantly, FM satellites are extremely valuable in providing an introduction to satellite communications and often used for demonstrations given at schools and public events.

With AO-85’s battery failure and AO-91 and AO-92 on borrowed time, AMSAT will soon find itself without an FM satellite in space. The time to act is now.

The Proposal

AMSAT’s Strategic Plan, Objective 4.1, FM Operations gives us fairly specific guidance: Develop, deploy, and support a series of 1u spacecraft to support continued FM amateur satellite operations in low Earth orbit. As such, any proposal must include a sustained FM presence in LEO.

The Fox-1 CubeSat series taught us some valuable lessons. First, batteries in in a 1U CubeSat are more likely to have a three-year life span, rather than the expected five years. Keeping battery levels above the minimal voltage rating is critical. The popularity of AMSAT’s FOX-1 series, especially at night, when the satellite was in eclipse, was the primary cause of their shortened battery life. Any proposal must include both battery management and battery failsafe. The design must include provisions that automatically switch the satellite to Low Power Mode (beacon and telemetry only), when the battery voltage drops to a cautionary level, and then automatically return to normal operations, when sufficient battery power is restored. In addition, the satellite must be designed so that when the battery fails, the transponder can continue to operate when the satellite is in sunlight. Similarly, the design should include an autonomous capability so that the FM repeater can operate without relying on ground control or a functioning processor in the command, control, and telemetry module. These safeguards and failsafes should extend the usable life of our satellites.

Second, it is impossible to keep a strict schedule, when relying on a “free ride” under NASA’s Educational Launch of Nanosatellites (ElaNa) initiative. Once accepted into the program and manifested on a launch, you are at the mercy of the launch provider, and things don’t always go as scheduled. Case in point, Fox-1D (AO-92) launched before Fox-1C (AO-95). To ensure the launch of one satellite every three years, we will need to purchase launches. In addition, we need to have a “flight spare” on standby in case there is an integration inspection issue with the primary satellite or a subsequent launch failure.

The Challenges

Every satellite project requires both people and funding. As mentioned already, all of our engineers are consumed by our GOLF program. This leaves us with either open-sourcing the project or purchasing a commercial, off-the-shelf satellite. Open-sourcing would work for the initial design process; however, there is no current precedent to allow the open-source building of a satellite under U.S. Export Administration Regulations (EAR).

While there are many commercial companies that offer complete off-the-shelf 1U CubeSat platforms, only one includes an FM repeater that meets our mission requirements. Purchasing a ready-to-fly CubeSat seems to be our

best course of action, given AMSAT engineers' focus on GOLF, but it comes at a cost.

Two 1U FM CubeSats (flight model and flight spare), a 1U FM CubeSat engineering model (without solar panels) and a 500 KM, Sun-synchronous orbit launch will cost just over $283,000. Each additional launch, one every three years, will cost approximately $138,000, as we would only need to purchase one CubeSat and the launch.

So that leaves us with the big question – How are we going to pay for it? An FM satellite provides a world-wide benefit. Therefore, we need to conduct an international fundraising campaign, partner with other AMSAT organizations, and request funding from other organizations.

The benefits of providing a sustained FM presence in LEO to promote and support amateur radio in space far outweighs the costs, especially when we implement a plan that allows our AMSAT engineers to continue their efforts on our path Onward & Upward.

If approved by our Board of Directors, I hope you will support us.

[ANS thanks Robert Bankston, KE4AL, AMSAT President, for the above information]

Changes to AMSAT TLE Distribution for September 30, 2021

The following satellite has been added to this week's AMSAT TLE Distribution:

CUTE - NORAD Cat ID 49263 (Thanks to Nico Janssen, PA0DLO for the identification. Downlink frequencies of 437.24997 MHz and 2402.000 MHz have been IARU coordinated.)

[ANS thanks Ray Hoad, WA5QGD, AMSAT Keplerian Elements Manager, for the above information]

ARISS News

Lycée Pierre Paul Riquet, St Orens De Gameville, France and CSUT University Space Center of Toulouse, Toulouse, France, Multi-point telebridge via IK1SLD

The ISS callsign is presently scheduled to be FXØISS
The downlink frequency is presently scheduled to be 145.800 MHz
The scheduled astronaut is Thomas Pesquet KG5FYG

Contact is go for: Sat 2021-10-02 12:40:14 UTC 34 deg

Watch for Livestream at www.ariotti.com and https://www.youtube.com/watch?v=Sgl8lELDcgA

Amateurs and others around the world may listen in on contacts between amateurs operating in schools and allowing students to interact with astronauts and cosmonauts aboard the International Space Station. The downlink frequency on which to listen is 145.800 MHz worldwide.

Columbus Module radios:
IORS (Kenwood D710GA) – STATUS - Configured. Supporting cross band repeater (145.990 MHz up {PL 67} & 437.800 MHz down). Next mode change is to packet operation (145.825 MHz up & down) after the school contact on October 2.

Power down for upcoming Soyuz docking on Oct. 05. Turning OFF Oct. 05 about
07:45 UTC. Back ON Oct. 05 about 18:50 UTC
Power down for upcoming Soyuz undocking on Oct. 17.
Power down for upcoming Progress relocate on Oct. 22-23.
Supporting USOS scheduled voice contacts, packet and voice repeater ops.

Service Module radios:
Kenwood D710E – STATUS - Radio usually off.
Power down for upcoming Soyuz docking on Oct. 05. Turning OFF Oct. 05
about 07:45 UTC.
Power down for upcoming Soyuz undocking on Oct. 17.
Power down for upcoming Progress relocate on Oct. 22-23.
Supporting ROS scheduled voice contacts and SSTV.

The latest information on the operation mode can be found at
https://www.ariss.org/current-status-of-iss-stations.html

The latest list of frequencies in use can be found at
https://www.ariss.org/contact-the-iss.html

[ANS thanks Charlie Sufana, AJ9N, one of the ARISS operation team mentors,
for the above information]

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[ANS thanks Paul Overn, KE0PBR, AMSAT Events page manager, for the above information]

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